REMARKS

The undersigned thanks the Examiner for the interview of November 22, 2002. Prior to the interview, the undersigned sent a copy of proposed claims, which are identical to the claims in this Amendment except, claim 20. The Examiner suggested amending proposed claim 20 to satisfy 112 rejection, which Applicants have done in this Amendment. In light of the proposed Amendment, the Examiner said that he would have to do a new search to determine if the claims are allowable.

The amendments are supported in the specification by the paragraph bridging pages 9 and 10, page 19, line 18, to page 20, line 11, and Figure 2. The amendment to the specification corrects typographical errors such that the legends are consistent with those shown in Figure 2.

Applicants thank the Examiner for carefully reviewing the application and providing a detailed Action.

Claims 1-2, 4-12 and 14-19 were rejected under 35 USC 112, second paragraph. This rejection is respectfully traversed and should be withdrawn because the limitation of claim 3, which defines "X" is inserted in claims 1 and 11. Claims 8 and 18 no longer contain "further optionally comprising" and "roughly equivalent" is changed to "substantially equal." Note that MPEP 2173.05(b) states that "substantially equal" is *not* indefinite under 35 USC 112, second paragraph.

Claims 1-4, 6-7, 11-14, 16 and 20 were rejected as being anticipated by Suzuki. This rejection is respectfully traversed and should be withdrawn because the limitation of claim 5, which was not rejected as being anticipated by Suzuki, has been inserted in claims 1, 11 and 20.

Claim 20 was rejected as being anticipated by Bertero. This rejection is respectfully traversed and should be withdrawn because the limitation of claim 5, which was not rejected as being anticipated by Bertero, has been inserted in claim 20.

Claims 5, 9, 15 and 19 were rejected as being obvious over Suzuki in view of Tanahashi. This rejection is respectfully traversed.

The magnetic recording medium of this invention uses an oxidized body-centered cubic (BCC) seedlayer of CrX for increasing the number of nucleation sites of the grains of magnetic layer because the influence of the increased nucleation sites on the seedlayer is exerted up to the magnetic layer. Furthermore, an HCP intermediate layer (referred to as the second underlayer in the claims) is used to "allow the bcc-hcp transition to occur without sacrifice of anisotropy in the magnetic layer." See page 20, lines 10 and 11, of the specification. However, Applicants unexpectedly found that the bcc-hcp interface is highly vulnerable to corrosion due the oxygen diffusion from the oxidized seedlayer. To solve this problem, Applicants found that the use of a non-oxidized Cr-containing layer between the oxidized seedlayer and the HCP layer solves the oxygen corrosion problem. Unexpectedly, the Cr-containing layer between the oxidized seedlayer and the HCP layer functions as a corrosion inhibitor.

Corrosion is electrochemical in nature. *McGraw Hill Encyclopedia of Science & Technology*, Vol. 7, 159 (1982). Local electrolytic cells are set up because of the presence of impurities, crystal lattice imperfections, or strains within the metal surface. *Id.* Because of a multitude of reasons for corrosion and a multitude of corrosion inhibitors, persons of ordinary skill in this art would have ***no*** technical reason to conclude that a non-oxidized Cr-containing layer between the oxidized seedlayer and the HCP layer would solve the oxygen corrosion problem at the interface of the HCP layer.

Furthermore, persons of ordinary skill in this art would have recognized that a corrosion inhibitor performs as corrosion inhibitor *in the environment* in which it located. As explained above, corrosion is due to "*[l]ocal electrolytic cells*." *Id.* Therefore, what could function as a corrosion inhibitor in a certain local environment would not necessarily function similarly in a different local environment. Therefore, it would be just hypothetical to assume that a person of ordinary skill would have selected the claimed layers, and in particular, in the order selected.

In short, the specific layers selected, and in the order selected, by Applicants and recited in the claims are unique. There is no suggestion or motivation in the cited references to combine the layers as recited in the claims.

On the issue of combining references, the Federal Circuit in *In re Sang Su Lee*, 277 F.3d, 1338, 61 USPQ2d 1430 (Fed. Cir. 2002), specifically states, "The need for specificity pervades this authority ... [and] *particular findings* [not just any reason] *must* be made as to the reason the skilled artisan, with *no* knowledge of the claimed invention, would have selected these components for combination in the manner claimed." [Citations omitted; emphasis added.] As explained above, and further in light of the decision in *In re Sang Su Lee*, Applicants submit that the obviousness rejection over Suzuki in view of Tanahashi should be withdrawn.

As a result of putting the layers as recited in the claims, Applicants found the following *unexpected results*:

(1) As mentioned above, oxygen corrosion at the interface between the bcc-hcp layer was minimized.

(2) As shown in Table 1, the grain size distribution (represented by standard deviation/mean) was decreased from 2.7 for a non-oxidized seedlayer to 2.2 for an oxidized seedlayer. Thus, "Fig. 3 shows that by using an embodiment of this

invention one is able to improve the intrinsic noise capability of a recording medium. Fig. 4 shows that the grain size is refined and is made more uniform when using an embodiment of this invention." Page 16, lines 15-18.

Please note, "Consistent with the rule that all evidence of nonobviousness *must* be considered when assessing patentability, the PTO *must* consider comparative data in the specification in determining whether the claimed invention provides unexpected results." *In re Soni*, 54 F.2d 746, 34 USPQ2d 1684 (Fed. Cir. 1995) (emphasis added).

Applicants submit that the only way that persons of ordinary skill in this art would have recognized that the combination of layers in the order recited in the claims allows for both the control of nucleation and prevention of oxygen corrosion is from Applicants' disclosure. This, of course, can not be properly relied upon to support the ultimate legal conclusion of obviousness under 35 USC 103. *Panduit Corp. v. Dennison Mfg. Co.*, 774 F.2d 1082, 227 USPQ 337 (Fed. Cir. 1985).

Claim 17 was rejected as being obvious over Suzuki in view of Bertero. This rejection is respectfully traversed and should be withdrawn in light of claim 11, which now includes the limitation of claim 5, which was disclosed in or suggested by Suzuki and Bertero.

Claims 8, 10 and 18 were rejected as being obvious over Suzuki and Tanahashi in view of Ivett. This rejection is respectfully traversed.

Claims 1 and 10, as amended, should now be allowable over Suzuki and Tanahashi. Therefore, claims 8, 10 and 18 should be allowable over Suzuki and Tanahashi in view of Ivett.

In light of the above, a Notice of Allowance is respectfully solicited.

Attached hereto is a marked-up version of the changes made to the specification by this amendment. The attached pages are captioned "Version with markings to show changes made."

In the event that the transmittal letter is separated from this document and the U.S. Patent and Trademark Office determines that an extension and/or other relief is required, applicants petition for any required relief including extensions of time and authorize the Commissioner to charge the cost of such petitions and/or other fees due in connection with the filing of this document to **Deposit Account No. 03-1952** referencing docket no. 146712001300.

Respectfully submitted,

Dated: December 10, 2002 By: _____

Raj S. Davé, Ph.D., J.D.
Registration No. 42,465

Morrison & Foerster LLP
1650 Tysons Boulevard
Suite 300
McLean, Virginia 22102
Telephone: (703) 760-7755
Facsimile: (703) 760-7777

VERSION WITH MARKINGS TO SHOW CHANGES MADE

In the Specification:

Replace the paragraph bridging pages 9 and 10, as follows:

[In one embodiment of this invention, a Cr-containing underlayer is interposed between the seedlayer and the magnetic layer. In another embodiment, the sequential stacking arrangement of the layers on the substrate is as shown in Figure 2. Figure 2 shows a non-magnetic substrate 10 having sequentially deposited on each side thereof a Cr-X or $(Cr\text{-}X)O_x$ seedlayer 11, 11', an Cr-containing underlayer 12, 12', a CoCr-containing intermediate layer 13, 13', a magnetic layer 14, 14', typically comprising a cobalt (Co) -base alloy, and a protective overcoat 15, 15', typically containing carbon. The role of the underlayer is to improve the crystallinity of the subsequent interface with the intermediate layer as well as to more closely assimilate the lattice parameters of the intermediate and magnetic layers.]

In one embodiment of this invention, a Cr-containing underlayer is interposed between the seedlayer and the magnetic layer. In another embodiment, the sequential stacking arrangement of the layers on the substrate is as shown in Figure 2. Figure 2 shows a non-magnetic substrate 10 having sequentially deposited on each side thereof a Cr-X or $(Cr\text{-}X)O_x$ seedlayer 21, 21', an Cr-containing underlayer 22, 22', a CoCr-containing intermediate layer 23, 23', a magnetic layer 24, 24', typically comprising a cobalt (Co) -base alloy, and a protective overcoat 25, 25', typically containing carbon. The role of the underlayer is to improve the crystallinity of the subsequent interface with the intermediate layer as well as to more closely assimilate the lattice parameters of the intermediate and magnetic layers.

In the Claims:

Cancel claims 3, 4, 5, 13, 14 and 15 without prejudice or disclaimer.

Amend claims 1, 6-9, 11, 16-20 as follows:

1. (Amended) A magnetic recording medium, comprising:

a substrate;

a seedlayer disposed on the substrate, wherein the seedlayer comprises a Cr-X containing material and a portion of the seedlayer is oxidized;

a Cr-containing first underlayer;

a second underlayer comprising an HCP alloy; and

a magnetic layer, in this order,

wherein a solid solubility of said X is at least 3 atomic percent in Cr, and said X is selected from the group consisting of aluminum, calcium, titanium, vanadium, manganese, iron, cobalt, nickel, zinc, or a mixture thereof.

6. (Amended) The magnetic recording medium of claim [4] 1, wherein the oxidized portion of the seedlayer contains from about 0.0001 atomic percent oxygen to about 20 atomic percent oxygen.

7. (Amended) The magnetic recording medium of claim [4] 1, wherein the oxidized portion of the seedlayer contains from about 0.01 atomic percent oxygen to about 0.9 atomic percent oxygen.

8. (Amended) The magnetic recording medium of claim 1, [further optionally comprising a CoCr-containing underlayer,] wherein the seedlayer has a Cr-X (110) interplanar spacing that is [roughly equivalent] substantially equal to a (0002) interplanar spacing of [a] the HCP alloy [within] in the [CoCr-containing] second underlayer [or the magnetic layer].

9. The magnetic recording medium of claim 1, [further comprising] wherein the second underlayer comprises a CoCr-containing [underlayer] material to form a first magnetic recording medium, the first magnetic recording medium exhibiting a stronger CoCr (11.0) peak by X-ray crystallography than that of a second magnetic recording medium that is similar to the first magnetic recording medium except that the seedlayer of the second magnetic recording medium contains substantially pure Cr.

11. (Amended) A method of manufacturing a magnetic recording medium, comprising:

depositing a seedlayer comprising a Cr-X containing material on a substrate, wherein a portion of the seedlayer is oxidized;

depositing a Cr-containing first underlayer;

depositing a second underlayer comprising an HCP alloy; and

depositing a magnetic layer [on the seedlayer], in this order,

wherein a solid solubility of said X is at least 3 atomic percent in Cr, and said X is selected from the group consisting of aluminum, calcium, titanium, vanadium, manganese, iron, cobalt, nickel, zinc, or a mixture thereof.

16. (Amended) The method of manufacturing a magnetic recording medium of claim [14] 11, wherein the oxidized portion of the seedlayer contains from about 0.01 atomic percent oxygen to about 0.9 atomic percent oxygen.

17. (Amended) The method of manufacturing a magnetic recording medium of claim [14] 11, wherein the oxidized portion of the seedlayer has a mean grain size diameter of 10 nm or less.

18. (Amended) The method of manufacturing a magnetic recording medium of claim 11, [further optionally depositing a CoCr-containing underlayer between the seedlayer and the magnetic layer,] wherein the seedlayer has a Cr-X (110) interplanar spacing that is [roughly equivalent] substantially equal to a (0002) interplanar spacing of [a] the HCP alloy [within] in the [CoCr-containing] second underlayer [or the magnetic layer].

19. (Amended) The method of manufacturing a magnetic recording medium of claim 11, [further comprising depositing] wherein the second underlayer comprises a CoCr-containing [underlayer] material to form a first magnetic recording medium, the first magnetic recording medium exhibiting a stronger CoCr (11.0) peak by X-ray crystallography than that of a second magnetic recording medium that is manufactured similarly to the first magnetic recording medium except that the seedlayer of the second magnetic recording medium contains substantially pure Cr.

20. (Amended) A magnetic recording medium comprising:

means for low noise recording, [and]

a magnetic layer,

an underlayer comprising a Cr-containing material and

a layer for allowing a BCC-HCP transition to occur between the underlayer and the magnetic layer.